

CLAIMS:

1. A composition suitable for medical and surgical applications,
comprising:
 - a biologically compatible scaffold material having at least one irregular
5 surface, and
 - a biologically compatible light-activated adhesive, the light-activated
adhesive being coupled to the scaffold to form a composite, such that when the
irregular surface of the composite is applied to biological tissue and the composite is
activated by light energy to repair the biological tissue, the composite has a tensile
10 strength of at least about 130% of the tensile strength of the adhesive alone.
2. The composition of claim 1, wherein the time-to-failure of the
biological tissue repair is at least about 150% of the time-to-failure of a composite
when a smooth surface of the scaffold is applied.
3. The composition of claim 1, wherein the light-activated adhesive
15 comprises a light absorber.
4. The composition of claim 3, wherein the light absorber includes one of
indocyanine green (ICG), methylene blue (MB), food colorings, pH indicators, water,
hemoglobin, and photosensitive pharmaceuticals.
5. The composition of claim 1, wherein the scaffold material comprises
20 one of small intestine submucosa and poly(L-lactic-co-glycolic acid) (PLGA).
6. A composition adaptable to repair biological tissue, comprising:
 - a biologically compatible scaffold material,
 - a biologically compatible adhesive, and
 - a light absorber including one of food colorings, pH indicators, water,
25 hemoglobin, and photosensitive pharmaceuticals.

7. The composition of claim 6, wherein the light absorber includes one of red food coloring, blue food coloring and green food coloring.

8. The composition of claim 6, wherein the light absorber is selected to provide a solder/interface temperature of $66 \pm 3^{\circ}\text{C}$.

5 9. The composition of claim 6, wherein the light absorber concentration is about 200 – 1000 μL / 13 mL of deionized water.

10. The composition of claim 9, wherein the light absorber concentration is about 600 μL / 13 mL deionized water.

11. The composition of claim 7, wherein the red food coloring includes red
10 #40.

12. The composition of claim 7, wherein the blue food coloring includes blue #1.

13. The composition of claim 6, wherein the green food coloring includes blue #1 and yellow #5.

15 14. A method for wound closure using the composition of claim 1, comprising the steps of:

applying the composition of claim 1 to a wound site, and
activating the composition with light energy.

15. The method of claim 14, wherein the composition of claim 1 is applied
20 to internal tissue.

16. A method for repairing, joining, aligning, or sealing ocular tissues including at least one of muscle and sclera, the method comprising the steps of:

combining a biologically compatible scaffold material and a light-activated adhesive to form a composite,

25 applying the composite to ocular tissue, and

activating the composite with light energy.

17. The method of claim 16, wherein the combining step includes the step of combining an adhesive and a light absorber with deionized water to form the light-activated adhesive.

5 18. The method of claim 17, further comprising the step of immersing the scaffold material in the light-activated adhesive.

19. The method of claim 17, further comprising the step of allowing the composite to dry.

20. The method of claim 16, further comprising the step of adding a light
10 absorber to the composite.

21. The method of claim 20, wherein the light absorber includes one of ICG, MB, red food coloring, blue food coloring, green food coloring, pH indicators, water, hemoglobin, and photo sensitive Rx's.

22. The method of claim 16, wherein the scaffold material includes PLGA
15 having an 85:15 lactic:glycolic co-polymer ratio and the light-activated adhesive includes 50% w/v bovine serum albumin.

23. The method of claim 16, wherein the scaffold material includes small intestine submucosa.

24. The method of claim 16, wherein the applying step includes applying
20 the composite to one of an extraocular muscle – extraocular muscle interface, a sclera– sclera interface, and an extraocular muscle – sclera interface.

25. A method for repairing, joining, aligning, or sealing an internal or external wound, the method comprising the steps of:

combining a biologically compatible scaffold material having at least
25 one irregular surface and a light-activated adhesive to form a composite,

applying the composite to a wound, and
activating the composite with light energy.

26. The method of claim 25, wherein the combining step includes the step of combining a light absorber and an adhesive to form the light-activated adhesive.

5 27. The method of claim 26, wherein the light absorber includes one of ICG, MB, red food coloring, blue food coloring, green food coloring, pH indicators, water, hemoglobin and photosensitive Rx's.

28. The method of claim 25, wherein the combining step includes immersing the scaffold material in the light-activated adhesive.

10 29. The method of claim 25, wherein the scaffold material includes one of PLGA and small intestine submucosa.

30. The method of claim 25, wherein the light-activated adhesive includes serum albumin.

31. The method of claim 25, wherein the wound includes one of aorta,
15 liver, spleen, small intestine and lung tissue.